

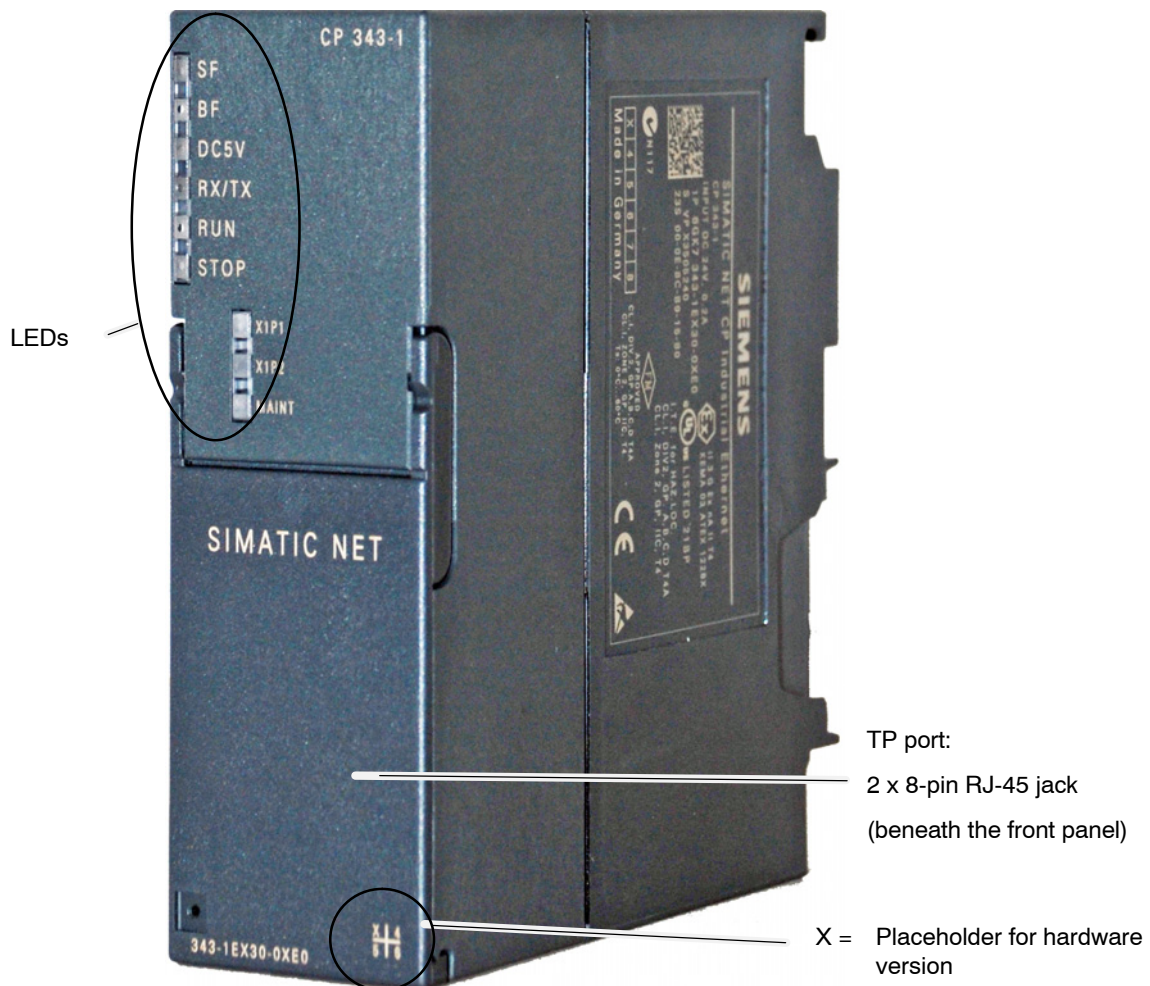
SIMATIC NET

S7-CPs for Industrial Ethernet

Manual Part B

CP 343-1 Lean

6GK7 343-1CX10-0XE0 as of hardware version 2, as of firmware version V2.2
for SIMATIC S7-300 / C7-300



Notes on the product

Product names

This description contains information on the following product

- CP 343-1 Lean
Order number 6GK7 343-1CX10-0XE0
as of hardware version 2 and firmware version V2.2
for SIMATIC S7-300 / C7-300

Note

In this document, the term CP is used instead of the full product name.

Compatibility with the previous version

Note

Make sure that you read the information regarding **extended functions and restrictions** in Chapter 7 of this manual!

Address label: Unique MAC address preset for the CP

The CP ships with a factory-set MAC address. The MAC address is printed on the housing.



Contents

Contents – Part A

Ethernet CPs – general information	see general part
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Note

Please remember that Part A of the device manual also belongs to the description of the CP. Among other things, it contains explanations of the safety notices and general information that applies to all S7 CPs for Industrial Ethernet.

Part A of the manual release 05/2008 and this Part B belong together

You can download the general Part from the Internet:

<http://support.automation.siemens.com/WW/view/en/30374198>

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1 Properties / Services

1.1 Application

The CP 343-1 Lean communications processor is intended for operation in a SIMATIC S7-300 or SIMATIC C7 automation system. It allows attachment of the S7-300 to Industrial Ethernet and supports PROFINET IO.

To integrate the CP in a linear bus or ring, to connect a further Ethernet device or to use PROFINET media redundancy, a 2-port real time ERTEC switch with autocrossing, autonegotiation and autosensing was integrated in the CP.

1.2 Communication services

The CP supports the following communication services:

- PROFINET IO

PROFINET IO allows direct access to IO devices over Industrial Ethernet.

- PROFINET IO device

Integration of the SIMATIC S7-300 programmable controller over the CP as intelligent PROFINET IO device.

- S7 communication and PG/OP communication with the following functions:

- PG functions (including routing)
 - Operator control and monitoring functions (HMI)
 - Server for data exchange on S7 connections configured at one end only without communication blocks on the S7-300 / C7-300 station

- Open communications services with the following functions:

- SEND/RECEIVE interface over ISO-on-TCP, TCP and UDP connections

UDP frame buffering on the CP can be disabled during configuration. When necessary, this allows you to achieve a shorter reaction time between the arrival of a UDP frame and its evaluation on the CPU.

- Multicast over UDP connection

The multicast mode is made possible by selecting a suitable IP address when configuring connections.

- FETCH/WRITE services (server; corresponding to S5 protocol) over ISO-on-TCP connections and TCP connections;

The addressing mode can be configured for FETCH/WRITE access as the S7 or S5 addressing mode.

- LOCK/UNLOCK with FETCH/WRITE services;
- Connection diagnostics using the user program

1.3 Other services

Within an Ethernet network with a ring topology, the CP supports the media redundancy protocol MRP. You can assign the role of redundancy client to the CP. There must be another node in the ring other than the MRP redundancy manager.

- Time-of-day synchronization over Industrial Ethernet using the following configurable modes:
 - SIMATIC mode

The CP receives MMS time messages and synchronizes its local time and the time of the CPU.

(accuracy approx. +/- 1 second)

You can choose whether or not the time of day is forwarded. The forwarding direction can also be selected (station > LAN or LAN > station).
 - or
 - NTP mode (NTP: Network Time Protocol)

The CP sends time-of-day queries at regular intervals to an NTP server and synchronizes its local time of day and the time of the CPU (accuracy approx. +/- 1 second).
- Addressing using a factory-set MAC address

The CP can be reached over the default MAC address to allow an IP address to be assigned.
- SNMP Agent

The CP supports data queries over SNMP version V1 (**S**imple **N**etwork **M**anagement **P**rotocol). It delivers the content of certain MIB objects according to the MIB II standard and LLDP MIB.
- Time of day for the diagnostic buffer

If a time master exists (using the NTP or SIMATIC mode), the time for CP-internal diagnostic buffer is synchronized over the LAN.
- Module access protection

To protect the module from accidental or unauthorized access, protection can be configured at various levels.
- IP configuration

For the PROFINET interface, you can configure how and with which method the CP is assigned the IP address, the subnet mask and the address of a gateway.

As an alternative to STEP 7, you have the option of assigning the connection configuration via a block interface in the user program (FB55: IP_CONFIG).

- Web diagnostics

With the aid of Web diagnostics, you can read out the diagnostic data from a station connected via the CP to a PG/PC with an Internet browser.

If you do not require this function, you can disable it in the STEP 7 configuration and disable the port 80.

2 Requirements for Use

2.1 Operation in controller device families

The CP can be operated in the following device families:

- S7-300 stations with the CPU types
 - Standard
 - Compact
 - Modular
- C7 control systems in C7 packaging system

The following tables show the devices with which the CP can be operated with this range of functions:

Notice

The tables list the CPUs and devices approved at the time of printing this manual. S7-300 CPUs or C7 or C7 control systems approved later and not listed in the table also support the range of functions described here.

Table 2-1 Use of the CP with S7-300

CPU	Order number
CPU 312	6ES7 312-1AD10-0AB0 6ES7 312-1AE13-0AB0
CPU 312C	6ES7 312-5BD01-0AB0 6ES7 312-5BE03-0AB0
CPU 312 IFM	6ES7 312-5AC02-0AB0
CPU 313	6ES7 313-1AD03-0AB0
CPU 313C	6ES7 313-5BE01-0AB0 6ES7 313-5BF03-0AB0
CPU 313C-2 DP	6ES7 313-6CE01-0AB0 6ES7 313-6CF03-0AB0
CPU 313C-2 PtP	6ES7 313-6BE01-0AB0 6ES7 313-6BF03-0AB0
CPU 314	6ES7 314-6AE01-0AB0 6ES7 314-6AE02-0AB0 6ES7 314-6AE03-0AB0 6ES7 314-6AE04-0AB0 6ES7 314-1AF10-0AB0 6ES7 314-1AF11-0AB0 6ES7 314-1AG13-0AB0

Table 2-1 Use of the CP with S7-300

CPU	Order number
CPU 314 IFM	6ES7 314-5AE03-0AB0 6ES7 314-5AE10-0AB0
CPU 314C-2 DP	6ES7 314-6CF02-0AB0 6ES7 314-6CG03-0AB0
CPU 314C-2 PtP	6ES7 314-6BF01-0AB0 6ES7 314-6BF02-0AB0 6ES7 314-6BG03-0AB0
CPU 315	6ES7 315-1AF03-0AB0
CPU 315-2 DP	6ES7 315-2AF03-0AB0 6ES7 315-2AG10-0AB0 6ES7 315-2AH14-0AB0
CPU 315-2 PN/DP	6ES7 315-2EG10-0AB0 6ES7 315-2EH13-0AB0 6ES7 315-2EH14-0AB0
CPU 315F-2 DP	6ES7 315-6FF01-0AB0
CPU 315F-2 PN/DP	6ES7 315-2FH10-0AB0 6ES7 315-2FH13-0AB0 6ES7 315-2FJ14-0AB0
CPU 315T-2 DP	6ES7 315-6TG10-0AB0
CPU 316-2 DP	6ES7 316-2AG00-0AB0
CPU 317-2 DP	6ES7 317-2AJ10-0AB0
CPU 317-2 PN/DP	6ES7 317-2EJ10-0AB0 6ES7 317-2EK13-0AB0 / 6ES7 317-2EK14-0AB0
CPU 317F-2 DP	6ES7 317-6FF00-0AB0 6ES7 317-6FF03-0AB0
CPU 317F-2 PN/DP	6ES7 317-2FJ10-0AB0 6ES7 317-2FK13-0AB0 / 6ES7 317-2FK14-0AB0
CPU 317T-2 DP	6ES7 317-6TJ10-0AB0
CPU 318-2	6ES7 318-2AJ00-0AB0
CPU 319-3 PN/DP	6ES7 318-3EL00-0AB0
CPU 319-3 F PN/DP	6ES7 318-3FL00-0AB0
CPU 614	6ES7 614-1AH03-0AB3

Table 2-2 Use of the CP in C7 control systems

C7	Order number
C7-613	6ES7 613-1CA01-0AE03 6ES7 613-1CA02-0AE3
C7-633 DP	6ES7 633-2BF02-0AE03
C7-635 Keys	6ES7 635-2EC01-0AE3 6ES7 635-2EC02-0AE3
C7-635 Touch	6ES7 635-2EB01-0AE03 6ES7 635-2EB02-0AE3
C7-636 Keys	6ES7 636-2EC00-0AE03 6ES7 636-2EC00-0AE3
C7-636 Touch	6ES7 636-2EB00-0AE3

2.2 Configuration

The following version of STEP 7 is required:

Table 2-3

STEP 7 version	Functions of the CP
V5.2 or higher	The range of functions of the CP 343-1 Lean (CX00) can be configured.
V5.4 or higher	Requirement for configuring the full functionality of the CP 343-1 Lean (CX10 with firmware V1.0) including PROFINET IO.
V5.4, Service Pack 5 + HSP 1043	Requirement for configuring the new functions of the CP.
V5.4, Service Pack 5, Hotfix 2 + HSP 1043	Requirement for configuring the new functions of the CP.

Installation of the Hardware Support Package (HSP)

You will find the HSP on the Internet at the following address:

www.siemens.com/automation/step7-hwconfig2

Install the HSP in STEP 7 / HW Config in the “Options” menu with the “Install Hardware Updates” menu command. You will find further information in the STEP 7 online help (under “HSP” or “Hardware update”).

After installing the HSP, close STEP 7. After restarting STEP 7, the CP is in the catalog of HW Config.

2.3 Programming

Programming – FCs / FBs

For some communications services, there are pre-programmed blocks (FCs/FBs) available as the interface in your STEP 7 user program.

Please refer to the documentation of the FCs / FBs in the online help of STEP 7 or in the manual /9/.

Notice

We recommend that you always use the latest block versions for all module types.

You will find information on the latest block version and links to download the current blocks in our Customer Support area on the Internet:

<http://support.automation.siemens.com/WW/news/en/8797900>

With the older module types, this recommendation assumes that you are using the latest firmware for the particular block type.

Caution

The communication blocks for S7-300 (SIMATIC NET block libraries for S7-300 in STEP 7) must not be called in more than one priority class! If, for example, you call a communication block in OB1 and in OB35, block execution could be interrupted by the higher-priority OB.

If you call blocks in more than one OB, you must write your program so that a communication block that is currently executing cannot be interrupted by another communication block (for example by disabling/enabling SFC interrupts).

3 Installation and Commissioning

3.1 Procedure / steps

Step	Explanation / meaning
1. Install the CP on the S7 standard rail. 2. Establish the connection via the enclosed bus connector to the backplane bus. Note The CP cannot be used in an extension rack that is connected via the IM 365! Reason: The required communication bus is not connected to the extension rack via the IM 365.	Slots 4 to 11 are permitted for the CP in racks 0 to 3 (connected by IM 360/361). Proceed as in the sections dealing with setup and wiring, described in detail in /1/.
3. Connect the CP to the power supply. Notes <ul style="list-style-type: none"> • The CPU, CP and IM (if one exists) must be connected to the same power supply. • Only wire up the S7-300 / C7-300 with the power switched off! 	Follow the steps as described in detail in /1/ when wiring between the power supply and the CPU.
4. Connect the CP to Industrial Ethernet.	
5. The remaining steps in commissioning involve downloading the configuration data.	To download the configuration, you can connect the PG as follows: <ul style="list-style-type: none"> • via MPI • via Industrial Ethernet For further details, refer to the general Part A of this manual: <ul style="list-style-type: none"> – addressing the first time (IP address assignment / node initialization); – downloading the defined configuration The PG/PC requires a LAN attachment, for example via a CP 1613 or CP 1411 and must have the necessary software (for example the S7-1613 package or SOFTNET IE). The TCP/IP protocol must be installed. The protocol used must then be applied to the S7ONLINE access point.

Step	Explanation / meaning
6. Use the diagnostic functions during commissioning and to analyze problems.	<p>The following options are available:</p> <ul style="list-style-type: none"> • The LED displays on the CP • Hardware diagnostics and troubleshooting with STEP 7 • Communication diagnostics with STEP 7 / NCM Diagnostics • Standard information using HW Config • Web diagnostics • If applicable, evaluation of the alarm block FB54 in the user program • Queries via SNMP

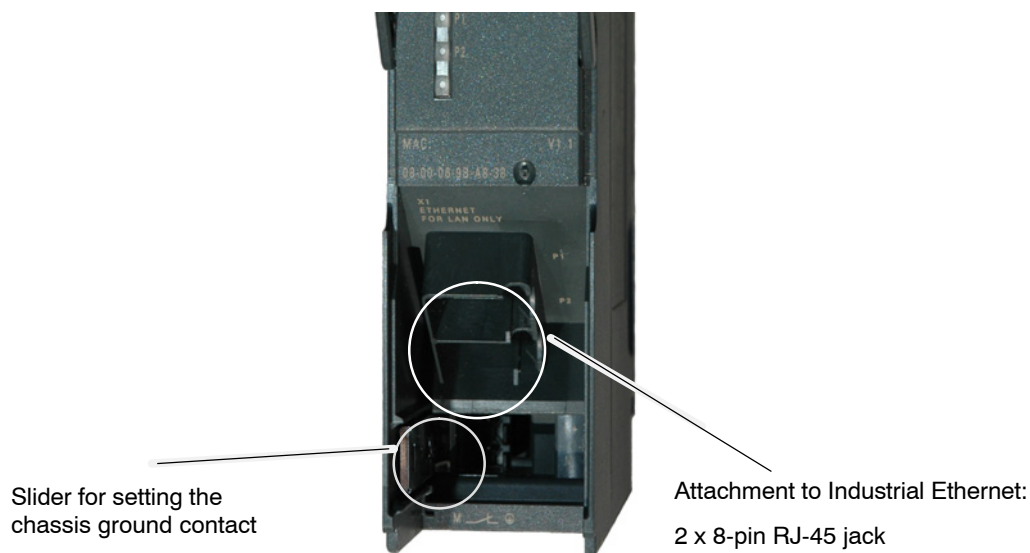


Figure 3-1 Connectors of a CP 343-1 Lean with the front panel open

Ground/chassis ground concept

Notice

Please note the instructions regarding the grounding and chassis ground concept in the SIMATIC S7 installation guides; see "SIMATIC S7 Programmable Controller S7-300 – Installation and Hardware: Installation Manual" /1/.

Behind the hinged panel on the left of the device, you will see a slider with which you can connect or disconnect the chassis ground of the 24 V power supply with reference ground.

- Slider pushed in: chassis and reference ground connected (note: the slider must be felt to lock in place).

- Slider pulled out: No connection between chassis and reference ground.

When shipped: Slider pushed in

Use a screwdriver to set the slider.

Note

An Ethernet cable can also be inserted and removed with the power supply on.

Note

The hinged front panel must be kept closed during operation.

The module must be installed so that its upper and lower ventilation slits are not covered, allowing adequate ventilation.



Warning

When used under hazardous conditions (zone 2), the devices must be installed in an enclosure.

Where ATEX 95 (EN 60079-15:2005, EN 60079-0:2006) applies, this enclosure must meet at least IP54 in compliance with EN 60529.

WARNING – EXPLOSION HAZARD: DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.



Warning

The device is designed for operation with safety extra-low voltage (SELV). This means that only safety extra-low voltages (SELV) complying with IEC950/EN60950/ VDE0805 may be connected to the power supply terminals.

The power unit for supplying the device must comply with NEC Class 2 as described by the National Electrical Code(r) (ANSI/NFPA 70).

The power of all connected power units in total must correspond to a limited power source (LPS).

Configuration

To set up the CP for the communications services, note the information on the topic of configuration in Section 2.2 of this device manual.

3.2 Module replacement without PG

General procedure

The configuration data for the CP is stored either on the CPU or on the CP. If the data is stored on the CPU, the module can be replaced with a module of the same type (identical order number) without a PG.

This option can be selected in the properties dialog of the CP (in the “Options” tab – “Replace Module without PG”). We recommend that you store the configuration data on the CPU if the configuration memory of the CPU allows.

For information on replacing previous modules, refer to the section “Compatibility” in Chapter 7.

Module replacement: Special feature of IP address assignment from a DHCP server

During configuration of the CP you can specify the IP configuration in the properties dialog; one option is to obtain the IP address from a DHCP server.

Notice

When replacing modules, remember that the factory-set MAC address of the new module is different from the previous module. When the factory-set MAC address of the new module is sent to the DHCP server, this will return either a different or possibly even no IP address.

Ideally, you should therefore configure IP as follows:

Always configure a client ID if you want to obtain the same IP address from the DHCP server after replacing the module.

If you have configured a new MAC address instead of the factory-set MAC address (generally the exception), the DHCP server always receives the configured MAC address and the CP obtains the same IP address as the replaced module.

3.3 Controlling the operating mode

You have the option of changing the mode of the CP between RUN and STOP using the STEP 7 / NCM S7 configuration software (PLC > Accessible Nodes).

Procedure

- Switch from STOP to RUN:

The CP reads the configured and/or downloaded data into the work memory and then changes to the RUN mode.

- Switch from RUN to STOP:

The CP changes to STOP. Established connections (ISO-on-TCP, TCP, UDP connections) are terminated (transitional phase with LED display "STOPPING");

The reaction is as follows in STOP:

- The communications connections mentioned above are terminated;
- The configuration and diagnostics of the CP is possible (system connections for configuration, diagnostics, and PG channel routing are retained);
- HTTP access is possible
- The routing function is active
- The time of day is not forwarded
- PROFINET IO is disabled.

4 LED Displays

The display on the front panel consists of 8 LEDs that indicate the operating mode and the communication status.

Front
panel:



SF
BF
DC5V
RX/TX
RUN
STOP































X1P1
X1P2
MAINT


The LEDs have the following meaning:

- SF: Group error
- BF: Bus fault PROFINET IO
- DC5V: DC 5 V power supply via the backplane bus (green = OK)
- RX/TX: Acyclic data exchange, for example SEND/RECEIVE (not relevant for PROFINET IO data)
- RUN: RUN mode
- STOP: STOP mode
- X1 / P1: Link status of Ethernet port 1
- X1 / P2: Link status of Ethernet port 2
- MAINT Maintenance necessary (Check/evaluate the diagnostic buffer)

LEDs for displaying the mode

The different combinations of the LEDs on the front panel indicate the status:

SF (red)	BF (red)	RUN (green)	STOP (yellow)	CP Operating Mode
	–			<ul style="list-style-type: none"> Starting up after power “ON” or Stopped (STOP) with errors <p>In this state, the CPU or intelligent modules in the rack remain accessible using PG functions.</p>
				Starting up (STOP->RUN)
				Running (RUN)
				Stopping (RUN->STOP)
				Stopped (STOP) In the STOP mode configuring and performing diagnostics on the CP remain possible.
–		–	–	<ul style="list-style-type: none"> Interface networked but no LAN cable inserted or Duplicate IP address detected
–			–	The CP is configured as a PROFINET IO device; there is no data exchange with the PROFINET IO controller.
	–		–	<ul style="list-style-type: none"> Running (RUN), with fault or Event viewer in conjunction with the MRP function <p>The CP diagnostic buffer provides detailed information.</p> <p>or</p> <ul style="list-style-type: none"> Advanced port diagnostics reports an error. Examples: <ul style="list-style-type: none"> Current port setting (transmission medium, duplex) does not match the configuration. Port interconnection does not match the configuration.
				Module fault / system error

Legend:  (colored) on  off  (colored) flashing “–” any

The “MAINT” LED

Notice

When the “MAINT” LED lights up, important error messages and/or diagnostic interrupts have occurred. The CP continues in RUN mode.

Check the entries in the diagnostic buffer of the device.






Firmware download – LED display patterns

The LED display patterns when downloading the firmware are described in Chapter 9.

LEDs for displaying the CP communication status

In addition to the LEDs that signal the CP state, the following LEDs provide information about the status of the CP interface to Industrial Ethernet.

Table 4-1

LED	Display	Meaning
RX/TX (green)		The CP is sending/receiving over Industrial Ethernet Note: PROFINET IO services are not signaled here.
P1 / P2 (green / yellow)		Port has no connection to Industrial Ethernet.
	 green	Existing connection over port to Industrial Ethernet (LINK status).
	 green / yellow	LED flashes yellow (constant light green): Port sending/receiving over Industrial Ethernet or PROFINET IO. Note: All received / sent frames are signaled for each specific port including those simply forwarded by the switch.
	 yellow	Continuous data transfer at the port over Industrial Ethernet (for example PROFINET IO).

Legend:  (colored) on  off  (colored) flashing “–” any

Module identification (PROFINET interface)

Using the SIMATIC Manager, you can search for and identify the module initially by browsing the connected network with the menu “PLC” > “Edit Ethernet Node”. If you select the found node in the “Browse Network” dialog, and then click “flash”, all the port LEDs of the PROFINET interface flash.

5 Performance Data / Operation

5.1 Number of possible connections over Ethernet

Table 5-1

Characteristic	Explanation / values
Permitted number of simultaneous connections in total over Industrial Ethernet	12 maximum

Example of maximum load

You can, for example, operate:

- 4 S7 connections
- 4 ISO-on-TCP connections
- 2 TCP connections
- 2 UDP connections

Also:

- Other TCP connections for Web diagnostics
- 1 PROFINET connection to a PROFINET IO controller

5.2 Characteristic data for S7 communication

Table 5-2

Characteristic	Explanation / values
Number of connections for S7 communication on Industrial Ethernet for <ul style="list-style-type: none"> • Operator control and monitoring functions (HMI) • S7 connections configured at one end 	4 maximum (connections configured at one end) (the number depends on the CPU type being used. Please refer to /1/ for the values for your CPU.)
LAN interface – data record length per protocol unit <ul style="list-style-type: none"> • sending • receiving 	240 bytes / PDU 240 bytes / PDU

Note

Measurements of transmission and reaction times in Ethernet, PROFIBUS and PROFINET networks for a series of configurations can be found on the Internet at the following address:

<http://support.automation.siemens.com/WW/view/en25209605>

5.3 Characteristics of the SEND/RECEIVE interface

The SEND/RECEIVE interface provides access to communication over TCP, ISO-on-TCP and UDP connections.

The following characteristics are important:

Table 5-3

Characteristic	Explanation / values
Number of ISO-on-TCP connections + TCP connections + UDP connections in total	8 maximum Notes: <ul style="list-style-type: none"> All UDP connections are also possible in the multicast mode Free UDP connections are supported by the CP.
Max. data length for blocks AG_SEND (V4.0 and higher) and AG_RECV (V4.0 and higher)	AG_SEND and AG_RECV allow the transfer of data fields of between 1 and 240 bytes. <ul style="list-style-type: none"> 1 to 8192 bytes for ISO-on-TCP, TCP; 1 to 2048 bytes for UDP
Restrictions for UDP <ul style="list-style-type: none"> Transfer is not confirmed No reception of UDP broadcast UDP frame buffering 	The transmission of UDP frames is unconfirmed, in other words the loss of messages is not detected or displayed by the send blocks (AG_SEND). To avoid communication overload resulting from a high broadcast load, the CP does not permit reception of UDP broadcast. Size of the frame buffer with buffering enabled: 2 Kbytes Note: Following a buffer overflow, newly arriving frames are discarded.

Execution times of the FCs AG_SEND / AG_RECV

To calculate the CPU cycle times (OB1) with SEND/RECEIVE connections, the execution time for the FCs (FC AG_SEND, FC AG_RECV) required for processing on the S7-300 / C7-300 CPU is the decisive factor.

Note

Measurements of transmission and reaction times in Ethernet, PROFIBUS and PROFINET networks for a series of configurations can be found on the Internet at the following address:

<http://support.automation.siemens.com/WW/view/en/25209605>

5.4 PROFINET IO

5.4.1 Characteristic data

CP as PROFINET IO device

Use the following components in the hardware catalog of STEP 7 / HW Config to configure the CP as PROFINET IO device :

PROFINET IO > I/O > SIMATIC S7-CP > CP... > **6GK.. > V2.2**

In contrast, use the component of the hardware catalog of STEP 7 / HW Config listed below in the following situations:

- The CP is assigned as an IO device to an IO controller that does not support “expanded diagnostics”.

PROFINET IO > I/O > SIMATIC S7-CP > CP... > **6GK..(migration) > V2.2**

The CP supports the following maximum configuration as a PROFINET IO device:

Table 5-4

Characteristic	Explanation / values
Size of the input area of the PROFINET IO device	512 bytes max.
Size of the output area of the PROFINET IO device	512 bytes max.
Size of the IO data area per submodule in a PROFINET IO device	
• Inputs	240 bytes
• Outputs	240 bytes
Size of the consistency area for a submodule	240 bytes
Maximum number of submodules	32

Execution times of the FCs PNIO_SEND / PNIO_RECV

The calculation of the reaction times with PROFINET IO is determined by the execution time of the function blocks required on the S7-300 CPU (PNIO_SEND, PNIO_RECV).

Note

Measurements of transmission and reaction times in Ethernet, PROFIBUS and PROFINET networks for a series of configurations can be found on the Internet at the following address:

<http://support.automation.siemens.com/WW/view/en25209605>

5.4.2 Operating PROFINET IO alongside other services

Sporadically used services

Please remember the following if you use other functions at the same time as PROFINET IO that affect the configuration or the mode (FB55; Primary Setup Tool, STEP 7, NCM Diagnostics):

Notice

These functions can influence operation with PROFINET IO to such an extent that an interruption of the cyclic I/O data exchange of the PROFINET IO devices lasting several seconds may result.

5.4.3 Effects of multicast communication on RT communication

Notice

If PROFINET IO RT communication is operated at the same time as broadcast (BC) or multicast (MC) in an Industrial Ethernet subnet, RT frames may be delayed by long BC frames or MC frames.

These frames can, for example, be generated by the communications FCs AG_SEND or AG_RECV.

With certain constellations, this can lead to a PROFINET RT communication abort. The factors that influence this are the switch configurations ("switch depth"), the update time and the MC/BC frame lengths.

For more detailed information on the influencing factors and possible solutions, refer to:

<http://support.automation.siemens.com/WW/view/en29104898>

5.5 Characteristic data of the integrated switch

Learning addresses / deleting addresses (aging time)

The switch integrated in the CP (PROFINET interface) reads the source addresses in the data packets. The switch therefore learns the addresses of the end devices connected via a port.

If the switch receives a data packet, it directs this packet only to the port via which the appropriate DTE can be obtained.

The switch monitors the age of the learned addresses. Addresses that exceed the "aging time" are deleted. The aging time is 5 minutes.

Ports can be deactivated individually

The ports of the switch integrated in the CP can be deactivated individually in STEP 7 / HW Config. This can, for example, be used for service purposes.

To do this, open the properties dialog of the relevant port and select the "disabled" setting under "Options > Transfer medium / duplex".

The port is turned off completely when it is deactivated. The corresponding LED on the device (for example P1) is then turned off.

6 The CP as Web server

Web diagnostics

The CP provides you with the function of a Web server for access using a Web browser.

The CP provides HTML pages for Web diagnostics.

With the following address, you have access to Web diagnostics:

`http:\\<IP address of the CP>`

Diagnostic buffer entries are output in English on the diagnostic pages. This is not influenced by the language selected for display of the Web pages.

For detailed information on Web diagnostics, refer to the general Part A of this manual.

Select the option “Activate Web server” under “Options” in the properties dialog of the CP.

Web browser

To access the HTML pages on the CP, you require a Web browser. The following Web browsers are suitable for communication with the CP (other browsers also possible):

- Internet Explorer (recommended version: 6.0 or higher)
- Opera (recommended version: 9.2 or higher)
- Firefox (recommended version: 2.0 or higher)

You will find these Web browsers, information and add-ons on the Internet.

7 Compatibility with Predecessor Products

7.1 Enhanced functions

The abbreviations used below to identify the modules (for example “CX00”) correspond to the last four characters of the mid section of the order number.

New: Enhanced functions compared with the CP 343-1 Lean CX10 with firmware version V2.0

The following features can be used with the module as of firmware version 2.2:

- Advanced Web diagnostics (can be disabled)
- New GSDML file
- Configurable PROFINET interface with planning of port topology
- Advanced PROFINET diagnostics
- LLDP and DCP frames can be disabled for specific ports
- Media redundancy (MRP) in PROFINET IO
- Use of the control block (FC10)
- I&M functions (configurable plant designation and location identifier)
- Configurable protection levels
- UDP buffering (can be disabled)
- New options for time-of-day synchronization
- Support of optimized PROFINET blocks FC11/FC12 version V3.0

7.2 Replacing older modules: spares / upgrading

Distinction

When replacing existing modules with the module described here, the following variants must be distinguished:

- **Use as a replacement:**

The situation described here is when an existing module can be replaced by a new module by removing and inserting it with no change to the configuration.

- **Upgrading** (functionally compatible module replacement)

The situation in this case is when the module described here can be used instead of an older module as long as adaptations are made in the configuration. The CP used previously is replaced by the new CP in the configuration.

Unless stated otherwise, the range of functions of the older module continues to be supported in both cases.

You can also upgrade modules listed under “use as a replacement”. This becomes necessary when you want to use new features that were not available on the previously used module.

Use as a replacement:

The CP 343-1 Lean (6GK7 343-1CX10-0XE0 - firmware version 2.0) described here can be used as a replacement for the following predecessor products:

- CP 343-1 Lean (6GK7 343-1CX00-0XE0)

If you replace a CP 343-1 Lean (CX00) module with a CP 343-1 Lean (CX10) and have STEP 7 version < V5.4, all the previous functions of the module remain available. Any port settings relating to Ethernet are adopted for port 1.

The additional second RJ-45 port is also available in the “Automatic setting” mode.

- CP 343-1 Lean (6GK7 343-1CX10-0XE0, firmware version 1.0, version 2.0 or version 2.1)

All previous functions remain available. The new functions of the relevant firmware version are available as well.

Upgrading

The following predecessor products can be upgraded to the CP 343-1 Lean (6GK7 343-1CX10-0XE0) described here:

- See modules in “use as a replacement”

Notice

For new user programs, please make sure that you always use the latest block versions. You will find information on the latest block version and links to download the current blocks on the Internet:

<http://support.automation.siemens.com/WW/news/en/8797900>

Module replacement

When replacing an older module with the module described here, keep to the steps outlined below:

Table 7-1

Originally configured module	Configuration steps
6GK7 343-1CX00-0XE0	<p>Case a: Configuration unchanged / replacement module</p> <p>If you do not have any new requirements compared with the previous CP (for example, PROFINET IO mode), no modification of the project engineering is necessary.</p> <p>Case b: Adapted configuration / upgrade</p> <p>If you want to use the extended functionality of the new CP, follow the steps below:</p> <ol style="list-style-type: none"> 1. In STEP 7 / HW Config, replace the previously configured CP Lean with the new module from the hardware catalog. 2. Extend your configuration to match your requirements, for example, by enabling the CP for PROFINET IO device mode. 3. Save, compile and download the configuration data to the CPU again.

8 Further Notes on Operation

8.1 Clear/reset and Reset to factory settings

If the CP was configured with the protection level “status dependent”, the following two functions are only available if the CPU is in STOP. You will find the setting in the properties dialog of STEP 7 > ”Options” > Module access protection.

Available functions

The following two functions are available for the CP:

- Clear / reset

Following this memory reset, the CP retains the preset MAC address and the retentive parameters. The CP is therefore immediately ready for downloads using the IP address.

The retentive parameters include:

- IP address, subnet mask and, if applicable, router address
- LAN settings

- Resetting to factory settings

Note

Using the functions described here to reset the memory, you do not modify the configuration data on the CPU!

If you subsequently upload the configuration data from the CPU to a PG you will always object the configuration data that were previously on the CP (with parameters, connections, IP address).

How to use the function

You can start the memory reset functions in STEP 7.

- Clear / reset

In STEP 7/HW Config with **PLC ▶ Clear/Reset**

or

In STEP 7 / NCM Diagnostics with **Operating Mode ▶ Clear/Reset Module**

- Factory defaults reset

In STEP 7 / NCM Diagnostics with **Operating Mode ▶ Reset to Factory Defaults**

Behavior after memory reset

The CPU in the S7 station does not recognize that the CP memory was reset. The CP therefore changes to the “stopped with error” state (see Chapter 4).

The configuration data must then be reloaded.

You can initiate this loading by turning the power off and on again.

8.2 Network settings with Fast Ethernet

Row “X1P1”: Properties of port 1 of the PROFINET interface

Row “X1P2”: Properties of port 2 of the PROFINET interface

Automatic setting or individual network settings

As default, the CP is configured for automatic detection (Autosensing/Autonegotiation/Autocrossing).

Notice

In normal situations, the basic setting ensures trouble-free communication. You should only change these in exceptional situations.

If you create a manual configuration for the CP, the automatic negotiation of the network settings (autonegotiation) is no longer effective. If, on the other hand, the communication partner works with autonegotiation, no communication will be established.

Only use manual configuration when the communication partner works with the same manually set configuration.

Autocrossing mechanism

The automatic setting also includes an “autocrossing” mechanism. With autocrossing, you can connect network components and end devices using either crossover or straight-through cables.

STEP 7 / NCM Diagnostics and Web diagnostics display the network setting

Diagnostics of the port settings for the CP described here is possible using the entries in the diagnostic buffer over Web diagnostics, SNMP, NCM diagnostics, and the LED displays.

You will find information on the currently used network settings in STEP 7 as follows:

- In NCM Diagnostics under the diagnostic object “Industrial Ethernet” in the “Network Attachment” group box;
- In HW Config with the menu command “PLC > Module Information”;
- In WEB diagnostics.

Further notes:

- Autocrossing
If you disable the “automatic setting” option, autocrossing is also disabled; which cable you can then use depends on the role of the CP (network component or end device).
- 10/100 Mbps network components without “autonegotiation”
If you use 10/100 Mbps network components that do not support “autonegotiation”, you may have to set the mode manually during CP configuration using STEP 7 / HW Config (in the properties dialog of the CP). As default, the CP is configured for automatic detection.
- Forcing a specific network setting instead of “Autonegotiation”
If your application requires a fixed network setting instead of “Autonegotiation”, both partner devices must have the same setting.
- No reaction to Autonegotiation query with manual configuration
Remember that if you configure the CP manually, it will not react to an autonegotiation query! As a result, a connected partner will not be able to make the required network setting and communication will not be established.
Example:
If, for example, the CP is set to “100 Mbps – full duplex”, a CP connected as partner will set “100 Mbps – half duplex”. Reason: Due to the fixed setting, no autonegotiation response is possible; the connected partner recognizes the 100 Mbps with autosensing but nevertheless remains in half duplex.

- Recommendation: Change “individual network settings” only over MPI.

If you modify the LAN settings in the properties dialog of the CP in the “Port Parameters” tab, these changes will be adopted by the CP and activated when the configuration data is downloaded to the CP. In some situations, the device may then no longer be obtainable over Ethernet.

We therefore recommend that you download configuration data to the S7 station over an MPI connection if you change this setting.

If you download the configuration data over the LAN interface, depending on the selected setting, it is possible that the current download will not be completed due to the changes to the configuration taking immediate effect and an inconsistent configuration is reported.

Example:

The download is started initially with the setting TP/ITP at 10 Mbps half duplex. If the “Individual network setting” is now changed to 100 Mbps full duplex, the download cannot be completed.

8.3 Influence of MPI on connections via Industrial Ethernet

If a station on **MPI** is added or removed, for example because a service PG has been connected or disconnected, it is possible that active communication connections on the communications bus are aborted. This has the following effects on the communication connections on Industrial Ethernet:

- All S7 connections are temporarily aborted.
This does not apply when using CPUs with a separate communication bus, for example:
CPU 318-2, CPU 317-2 PN/DP, CPU 319-3 PN/DP, CPU 315-2 PN/DP, CPU 315F-2 PN/DP, CPU 317-2 DP, CPU 317T-2 DP, CPU 317F-2 DP, CPU 317F-2 PN/DP, CPU 318-2 DP
- The connections on which a job on the communication bus with a data length > 240 bytes is being processed are aborted temporarily.
- FETCH/WRITE connections are temporarily aborted.

On the FC interface in the user program, the condition codes made up of the DONE, ERROR and STATUS parameters must be evaluated in FC5 / FC6.

8.4 IP configuration

8.4.1 Detection of double IP addressing in the network

To save you time-consuming troubleshooting in the network, the CP detects double addressing in the network.

The reaction of the CP when double addressing is detected varies as follows:

- CP during startup

When the CP starts up (after return of power or after assignment of an Ethernet address), the CP sends out a query for its own IP address on the network. If there is a response, the CP does not start up! The error is indicated by an LED (display "stopped (STOP) with error" + LED "BF") and by an entry in the internal diagnostic buffer.

The CP remains in STOP

When you eliminate the cause by removing the device with the same IP address or changing its address, you must then restart the CP.

- CP in RUN mode

In RUN, the CP also sends this query at intervals of one minute to detect double IP addresses.

If a double IP address is detected, the CP also reports this via the LEDs (BUSF LED) and generates an entry in the diagnostic buffer.

The CP remains in RUN mode.

8.4.2 Obtaining the IP address over DHCP: CP STOP on expiry of the lease

If you have configured "Obtain IP address from a DHCP server", when the CP starts up, it is assigned a valid IP address by the DHCP server for a restricted time (period of the lease).

When the lease expires the reaction of the CP is as follows:

The CP changes to STOP and loses the previously assigned IP address if the DHCP server does not extend it before expiry of the lease. All communication connections are terminated.

8.5 Media redundancy

You can use the CP in a ring topology with media redundancy. The CP can only be a redundancy client.

You create the configuration in STEP 7 in the properties dialog of the PROFINET interface in the “Media redundancy” tab (HW Config: Row “X2 (<device name>)”).

For more detailed information on configuration, refer to the online help of the “Media redundancy” tab and in Part A of the manual.

8.6 Time-of-day synchronization

General rules

The CP supports the two modes explained below for time-of-day synchronization:

- SIMATIC mode
- NTP mode (NTP: Network Time Protocol)

Note

No automatic changeover to daylight saving is defined in NTP. As a result, you may need to implement this changeover using a program application.

Notice

Note the following regarding time-of-day synchronization in NTP mode:

If the CP recognizes an NTP frame as being “not exact” (example: NTP server is not externally synchronized), it is not forwarded to the communication bus. If this problem occurs, none of the NTP servers is displayed as “NTP master” in the diagnostics; rather all NTP servers are displayed only as being accessible.

Forwarding the time-of-day message

You can configure the direction in which time-of-day messages are forwarded in STEP 7 / NCM S7 in the properties dialog of the CP as follows.

- Configuration “from station to LAN”

The CP forwards time frames from the CPU to Industrial Ethernet when the local CPU is time master (SIMATIC mode only) or when the time of day is forwarded by a different CP on the K bus.

- Configuration “from LAN to station”

The CP forwards time frames from Industrial Ethernet to the CPU when one of the following components is time master:

- In the SIMATIC mode:
 - a remote CPU 41x
 - a SIMATIC NET time transmitter
 - a CP 1430 TF
- an NTP server when using the NTP mode

As default, time-of-day synchronization is not activated for the CP and it does not therefore forward the time. However, the internal clock of the CP is synchronized even in this case if a time-of-day frame is received from the communication bus or from Industrial Ethernet.

Synchronization using one of the two modes described here must be configured in STEP 7 in the properties dialog of the CP – “Time-of-Day Synchronization” tab.

For more detailed information on the parameters and options, please refer to the online help in the properties dialog.

Coordinating forwarding of the time of day with several CPs

If there is more than one CP in a station connected to the same network, only one of these CPs is allowed to pass on time-of-day messages.

You can therefore make the following settings in the configuration:

- Automatic

The CP receives the time-of-day message from the LAN or from the station and forwards it to the station or to the LAN.

If several CPUs are being operated in the station, this automatic setting can lead to collisions. To avoid this, you can specify the direction of forwarding with the following options:

- From station to LAN
- From LAN to station

8.7 SNMP agent

SNMP (Simple Network Management Protocol)

The CP supports data queries via SNMP in Version 1. It returns the contents of certain MIB objects according to the MIB II standard, LLDP MIB.

SNMP is a protocol for managing networks. To transmit data, SNMP uses the connectionless UDP protocol.

The information on the properties of SNMP-compliant devices is entered in MIB files (MIB = Management Information Base).

Where to find further information

For more detailed information on working with MIB files, refer to the documentation of the SNMP client you are using (example of an SNMP client: SNMP OPC Server from SIMATIC NET).

You will find more information on MIB on the following SIMATIC NET Internet page:

<http://support.automation.siemens.com/WW/view/en/15177711>

Supported MIB objects

The CP supports the following groups of MIB objects of the MIB II standard in compliance with RFC1213:

- System
- Interfaces
- Address Translation (AT)
- IP
- ICMP
- TCP
- UDP
- SNMP

The other groups of the MIB II standard are not supported:

- EGP
- Transmission

The CP also supports the LLDP-MIB according to IEEE 802.1AB and the PROFINET expansions of the LLDP-MIB (see also IEC 61158-10-6).

Exceptions / restrictions:

- Write access is permitted only for the following MIB objects of the system

group:

sysContact, sysLocation and sysName;

For all other MIB objects / MIB object groups, only read access is possible for security reasons.

- Traps are not supported by the CP.

“Interfaces” MIB group

This group returns status information about the CP interfaces. The MIB objects of the ifTable provide the status information of the interfaces. The “ifIndex” object identifier is assigned to the CP interfaces as follows:

ifIndex	Type of interface
1–2	Port 1–2
3	Internal CP interface

Access permissions using community name

The CP uses the following community names to control the access rights in the SNMP agent:

Type of access	Community name *)
Read access	public
Read and write access	private

*) Note the use of lower-case letters!

8.8 Possible security gaps on standard IT interfaces: preventing illegal access

With various SIMATIC NET components, such as switches, a wide range of parameter assignment and diagnostic functions (for example, Web servers, network management) are available over open protocols and interfaces. The possibility of unauthorized misuse of these open protocols and interfaces by third parties, for example to manipulate data, cannot be entirely excluded.

When using the functions listed above and these open interfaces and protocols (for example, SNMP, HTTP), you should take suitable security measures to prevent unauthorized access to the components and the network particularly from within the WAN/Internet.

Notice

We expressly point out that automation networks must be isolated from the rest of the company network by suitable gateways (for example using tried and tested firewall systems). We do not accept any liability whatsoever, whatever the legal justification, for damage resulting from non-adherence to this notice.

If you have questions on the use of firewall systems and IT security, please contact your local Siemens office or representative. You will find the address in the SIMATIC catalog IK PI or on the Internet at

<http://www.automation.siemens.com/partner/guisearch.asp>

8.9 Interface in the user program

8.9.1 Programmed communication connections with FB55 IP_CONFIG (PROFINET interface)

Downloading the configuration using FB55

FB55 allows program-controlled transfer of the configuration data.

Note

If the CP is in PG STOP mode, the configuration is downloaded using FB55; the CP then changes automatically to RUN.

8.9.2 Programmed communications connections – Assigning parameters to the ports

The CP now supports the following settings when assigning parameters to the ports in the parameter block for TCP connections and UDP connections:

- SUB_LOC_PORT parameter
The port can be specified as an option when the connection is established actively.
- SUB_REM_PORT parameter
The port can be specified as an option when the connection is established passively.

9 How to Load New Firmware

Requirements

You download new firmware to a SIMATIC NET CP using the firmware loader shipped with STEP 7 / NCM S7.

Requirements for downloading

- To download firmware, you require an Industrial Ethernet CP module in the PG/PC (for example, CP 1613) or a normal Ethernet module with the “Softnet” software package.
- The S7-ONLINE interface must be set to the “ISO – Industrial Ethernet” protocol. It is not possible to download using TCP/IP (and therefore not to other networks).













How to download new firmware




You always start the download using the active MAC address of the CP!

LEDs to indicate the CP mode

The different combinations of the LEDs on the front panel indicate the status:

Table 9-1

SF (red)	BF (red)	RUN (green)	STOP (yellow)	CP operating mode
				Downloading firmware.
				Firmware was successfully downloaded.
				Firmware could not be downloaded.

Legend:  (colored) on  off  (colored) flashing “–” any

What to do if a download is interrupted

Disturbances or collisions on the network can lead to packets being lost. In such cases, this can lead to an interruption of the firmware download. The firmware loader then signals a timeout or negative response from the module being loaded.

In this case, turn the station off and on again and repeat the download.

10 Technical Specifications

Transmission rate	10 Mbit/s und 100 Mbit/s
Connection to Ethernet	2 x RJ-45 jack
Power supply	DC +24 V (permitted range: +20.4 V through +28.8 V)
Current consumption <ul style="list-style-type: none"> from backplane bus from external 24 V DC 	0.2 A maximum TP: approx. 0.2 A maximum
Power loss approx.	5.8 W
Permitted ambient conditions <ul style="list-style-type: none"> Operating temperature Transportation/storage temperature Relative humidity max. Altitude Pollutant concentration 	0 °C to +60 °C in vertical operation 0 °C to +40 °C in horizontal operation –40 °C to +70 °C 95% at +25 °C up to 2000 m above sea level According to ISA–S71.04 severity level G1, G2, G3
Design <ul style="list-style-type: none"> Module format Dimensions (W x H x D) in mm Weight approx. 	Compact module S7-300; single width 40 x 125 x 120 220 g

In addition to this, all the information in the S7-300 reference manual /13/ “Module Data” in the section “General Technical Specification” on the topics listed below applies to the CP:

- Electromagnetic compatibility
- Transportation and storage conditions
- Mechanical and climatic ambient conditions
- Insulation tests, class of protection and degree of protection

11 Other Information available about the CP

FAQs on the Internet

You will find detailed information (FAQs) on using the CP described here on the Internet under the following entry number (entry type "FAQ"):

<http://support.automation.siemens.com/WW/view/en/10806067>

GSDML file

You will find the GSDML file for the CP described here on the Internet under the following entry ID (Entry type "Download"):

<http://support.automation.siemens.com/WW/view/en/19698639>

You will find the following information in the general Part A of the manual:

- A list of the documents required for configuration, commissioning and operation (Preface)
- Detailed descriptions of configuration and commissioning of the module
- Description of Web diagnostics and NCM S7 Diagnostics
- The approvals of the device (Appendix)
- A glossary (Appendix)

The general Part A of the manual is available in the Manual Collection that ships with the device or on the Internet at the following address (Entry type "Manuals"):

<http://support.automation.siemens.com/WW/view/de/27103175>

Manual Release 05/2008 has the ID 30374198.

12 References and Literature

Locating Siemens literature

The order numbers for Siemens documentation can be found in the catalogs "SIMATIC NET Industrial Communication, catalog IK PI" and "SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70".

You can obtain these catalogs and any further information you require from your local SIEMENS office or national head office.



Some of the documents listed here are also in the SIMATIC NET Manual Collection supplied with every S7-CP.

Many SIMATIC NET manuals are available on the Internet pages of Siemens Customer Support for Automation:

<http://support.automation.siemens.com/WW/view/de>

Enter the ID of the relevant manual as a search key. The ID is shown below the literature name in brackets.

Manuals that are installed with the online documentation of the STEP 7 installation on your PG/PC, can be selected from the Start menu (Start > SIMATIC > Documentation).

You will find an overview of the SIMATIC documentation at:

http://www.automation.siemens.com/simatic/portal/html_76/techdoku.htm

On configuration, commissioning and use of the CP

- /1/ SIMATIC NET
S7 CPs for Industrial Ethernet
Manual
Siemens AG
(manual for each CP in the SIMATIC NET Manual Collection)
- /2/ Version history / current downloads for SIMATIC NET S7 CPs
Siemens AG
(SIMATIC NET Manual Collection)

On configuration with STEP 7 / NCM S7

- /3/ NCM S7 for Industrial Ethernet
Primer
Siemens AG
Part of the online documentation in STEP 7

- /4/ SIMATIC NET, Instructions
 Commissioning PC Stations
 Siemens AG
 (SIMATIC NET Manual Collection)

- /5/ SIMATIC
 Configuring Hardware and Connections with STEP 7
 Part of the STEP 7 documentation package STEP 7 Basic Knowledge”
 Part of the online documentation of STEP 7
 Siemens AG

On project engineering of PROFINET CBA (components and systems):

- /6/ Component based Automation – Configuring Plants with SIMATIC iMap
 Manual
 Siemens AG
 (ID: 18404678)

- /7/ Basic Help in the SIMATIC iMap Engineering Tool (online help)
 Siemens AG

- /8/ Component Based Automation – Configuring Plants in SIMATIC iMap
 Siemens AG
 (ID: 22762190)

 You will find further information on SIMATIC iMAP at:

 <http://support.automation.siemens.com/WW/view/en/0805413>

On programming

- /9/ SIMATIC NET
 Functions (FC) and Function Blocks (FBs) for SIMATIC NET S7 CPs
 Programming Manual
 Siemens AG
 (SIMATIC NET Manual Collection)
 (ID: 30564821)

- /10/ Version history of the SIMATIC NET function blocks and functions for SIMATIC S7
 Reference work
 Siemens AG
 (SIMATIC NET Manual Collection)

- /11/ SIMATIC – Programming with STEP 7
 Part of the STEP 7 documentation package STEP 7 Basic Knowledge
 Part of the online documentation of STEP 7
 Siemens AG

- /12/ Automatisieren mit STEP 7 in AWL und SCL (ISBN: 978-3-89578-280-0) /
Automating with STEP 7 in STL and SCL (ISBN: 978-3-89578-295-4)
User manual, programming manual
Berger, Hans
Publicis KommunikationsAgentur GmbH, GWA, 2006

For installation and commissioning of the CP

- /13/ SIMATIC S7
S7-300 Automation System
– CPU 31xC und 31x Installation: Operating Instructions (ID: 13008499)
– Module Data: Reference Manual (ID: 8859629)
Siemens AG
- and
- SIMATIC S7
S7-400, M7-400 Automation system
– Installation Manual (ID: 1117849)
– Module Data: Reference Manual (ID: 1117740)
Siemens AG

On using and configuring PROFINET IO

- /14/ SIMATIC
PROFINET System Description
System Manual
Siemens AG
(Part of the Manual Collection)
- /15/ SIMATIC
From PROFIBUS DP to PROFINET IO
Programming Manual
Siemens AG
(Part of the Manual Collection)

On the IT functions of the CPs

- /16/ Data Security in Industrial Communication
White Paper
SIEMENS AG
(http://www.automation.siemens.com/net/html_76/support/whitepaper.htm)
- /17/ Creating Java Beans with IBM VisualAge
SIEMENS AG
(ID: 10499820)

- /18/ S7Beans / Applets for IT-CPs
 Programming Aid
 SIEMENS AG
 (SIMATIC NET Manual Collection)
 (ID: 24843908)

On setting up and operating an Industrial Ethernet network

- /19/ SIMATIC NET
 Manual Twisted Pair and Fiber-Optic Networks
 Siemens AG
 (SIMATIC NET Manual Collection)
- /20/ SIMATIC NET
 Manual Triaxial Networks
 (SIMATIC NET Manual Collection)

SIMATIC and STEP 7 basics

- /21/ Communication with SIMATIC
 System Manual
 Siemens AG
 (ID: 25074283)
- /22/ Documentation package "STEP 7 Basic Knowledge"
 with
 – Working with STEP 7 V5.4 Getting Started (ID: 18652511)
 – Programming with STEP 7 (ID: 18652056)
 – Configuring Hardware and
 Communication Connections with STEP 7 (ID: 18652631)
 – Form S5 to S7, Converter Manual (ID: 1118413)
 Siemens AG
 Order number 6ES7 810-4CA08-8AW0
 Part of the online documentation in STEP 7
- /23/ Documentation package "STEP 7 Reference"
 with
 – Statement List (STL) for S7-300/400 (ID: 18653496)
 – Ladder Diagram (LAD) for S7-300/400 (ID: 18654395)
 – Function Block Diagram (FBD) for S7-300/400 (ID: 18652644)
 – System and Standard Functions for S7-300/400 Volumes 1 and 2 (ID: 1214574)
 – System software for S7-300/400 System and Standard Functions Part 2
 Siemens AG
 Order number 6ES7 810-4CA08-8AW1
 Part of the online documentation in STEP 7

Other topics

- /24/** Ethernet, IEEE 802.3 (ISO 8802-3)
(<http://www.ieee.org>)
- /25/** RFC1006 (ISO Transport Service on top of the TCP Version: 3)
Request For Comment
(<http://www.ietf.org>)
- /26/** RFC793 (TCP)
(<http://www.ietf.org>)
- /27/** RFC791 (IP)
(<http://www.ietf.org>)